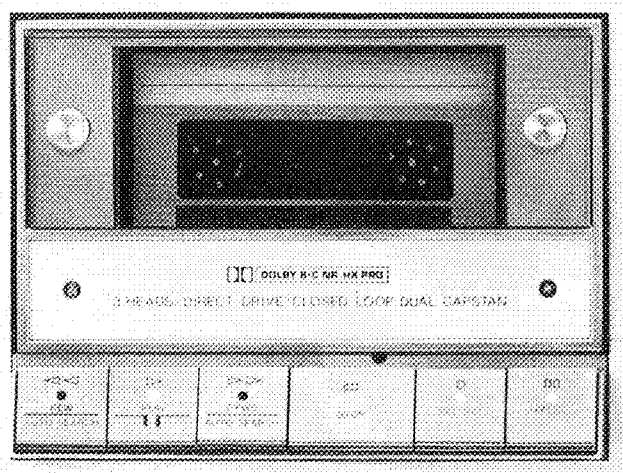
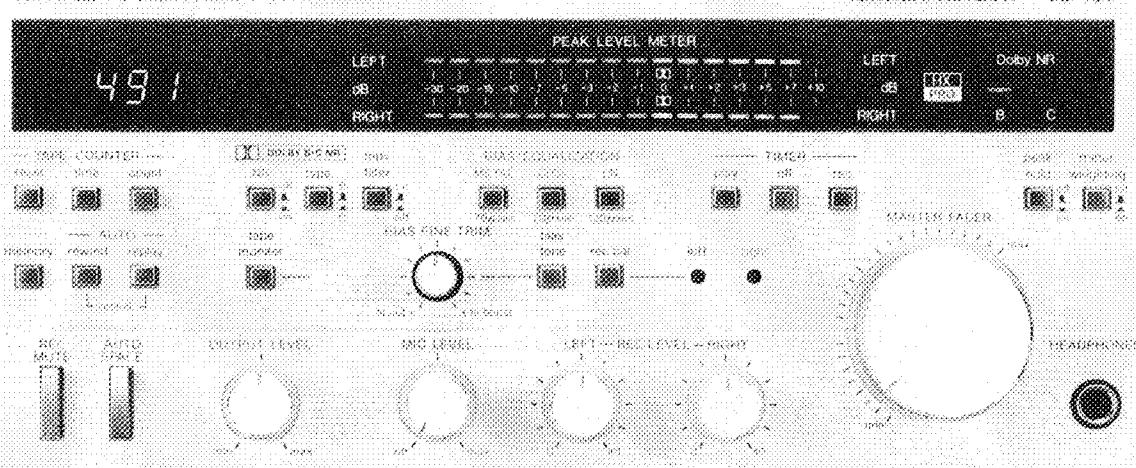
owner's manual

# CD491

**harman/kardon**
ULTRAWIDEBAND
LINEAR PHASE
CASSETTE DECK



# FEATURES

Congratulations on your choice of the Harman Kardon CD491 Ultrawideband Cassette Deck.

In order to appreciate the full performance of this sophisticated unit, please be sure to read this owner's manual and use your cassette deck only in accordance with its instructions. Keep it in safe place for future reference.

**CAUTION:** TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

**WARNING:** TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

### ■ 3-Head Configuration

Individual heads are employed for record and playback. The sendust record head and ferrite playback head are each optimized for their specific purpose. This reduces distortion while increasing high frequency response and dynamic range, it also allow monitoring the recording while it is in progress.

### ■ Closed-Loop Dual Capstan Transport

A closed-loop dual capstan tape transport mechanism ensures smooth, precise tape speed.

### ■ Dolby* HX-Professional Headroom Extension System

This improves high level, high frequency recording capability.

### ■ Dolby B and C Noise Reduction

This model is capable of providing the standard Dolby B, as well as the new Dolby C noise reduction. Dolby C has twice the noise reduction effect of Dolby B, and also improves high level, high frequency response.

### ■ Bias Fine Trim

This feature allows precise adjustment of the record bias so that optimum performance can be obtained from any tape.

### ■ Record Calibration

A record calibration adjustment is provided to match the record/playback level to the sensitivity of the tape being used.

### ■ Electronic Clock / Tape Counter

The tape counter has an electronic LED digital display. It can also indicate the elapsed time of a recording.

* Noise reduction and headroom extension manufactured under license from Dolby Laboratories Licensing Corporation. HX Professional originated by Bang and Olufsen. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

*This manual applies to champagne gold and black versions with this model CD491.*

## Always Use 120V AC

This unit is designed for operation with 120V AC. Use only domestic AC outlets. Never connect the unit to an outlet supplying a higher voltage. This may create a fire hazard.

## Handle the Power Cord Gently

- Do not disconnect the plug from the AC outlet by pulling the cord; always pull the plug itself. Pulling the cord may break the wire.
- If you do not intend to use your unit for any considerable length of time, disconnect the plug from the AC outlet.
- Do not place furniture or other heavy objects on the cord, and try to avoid dropping heavy objects on it. Also do not make a knot in the power cord. Not only may the cord be damaged, it can also cause a short circuit with a consequent fire hazard.

## Place of Installation

Place your unit on a firm and level surface. Avoid installing your unit under the following conditions:

- Moist or humid places.
- Places exposed to direct sunlight or close to heating equipment.
- Extremely cold locations such as those in the direct draught from an air conditioner.
- Places subject to excessive vibration or dust.
- Poorly ventilated places.
- Near a television, speaker or other object that generates a strong magnetic field.

## Moving the Unit

Before moving the unit, be sure to unplug the power cord from the AC outlet and disconnect the interconnection cords to other units.

## Do Not Open the Cabinet

To prevent fire or shock hazard, do not tamper with internal components for inspection or maintenance. Harman Kardon does not guarantee against performance degradation resulting from any modification.

If water, a hairpin or wire accidentally enters the unit, immediately unplug the power cord from the AC outlet to prevent shock and consult an authorized Harman Kardon service station. If you use the unit under this condition, it may cause a fire or shock hazard.

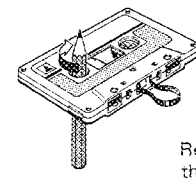
## Cleaning

When the unit gets dirty, wipe it with a soft dry cloth. If necessary, wipe it with a soft cloth soaked with mild soapy water and then wipe with a dry cloth.

Never use benzine, thinner, alcohol or other volatile agent, and avoid spraying an insecticide near the unit.

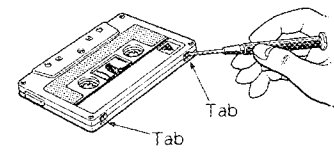
## Cassette Tape Handling

- Be sure to remove the cassette tape from the cassette compartment at the end of operation to preserve the tape quality and maintain the cassette deck's performance.
- Store cassette tapes away from a strong magnetic field such as near a TV set, receiver or speakers to prevent an adverse effect on the recorded signal.
- Before a cassette tape is played back or recorded, be sure to eliminate any tape slack. A slackened tape, if used, may cause jamming in the tape transport mechanism.



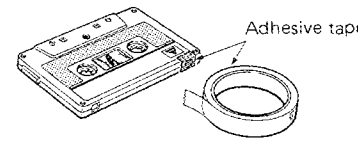
Remove tape slackness by winding the tape reels with a pencil.

- If the sound recorded on the tape is to be protected from accidental erasure, remove the erase-prevention tabs in the cassette shell. With these tabs broken out, accidental erasure is prevented, because your unit will automatically detect that the tabs have been removed, and will not enter the record mode.




Break the tabs off with a screwdriver.

- If it is later desired to record on a cassette tape protected in this way, cover the holes with adhesive tape.




## Cassette Tape and Corresponding Tape Selector Settings

The table below shows several types of major brand tapes and the corresponding tape selector settings.

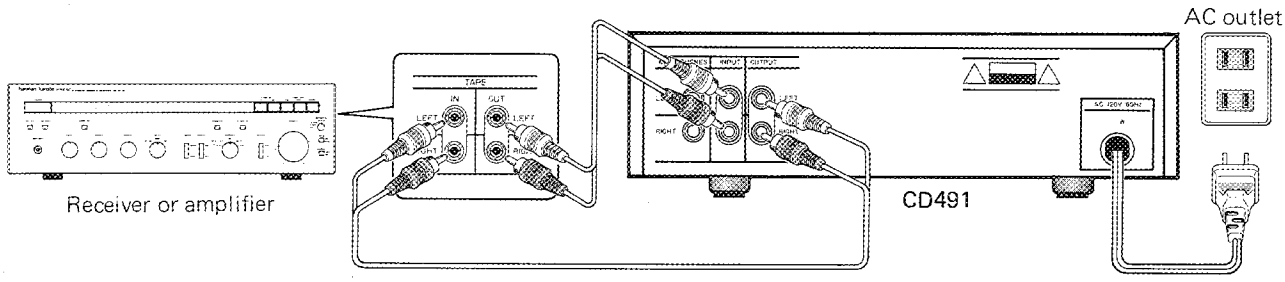
| Position | LN | $CrO_2$ | METAL |
|---|---|---|---|
| MAXELL | UD<br>*XLI<br>XLI-S | XLII<br>XLII-S | MX |
| TDK | AD<br>AD-X<br>OD | *SA<br>SA-X | *MA |
| SONY | HFX (BHF)<br>SHF (AHF) | UCX<br>UCX-S | METALLIC |
| FUJI | FR-I | FR-II | SR |
| BASF | PRO-I | PRO-II | PRO-IV |
| Scotch | XS-I | XS-II | METAFINE |

Tapes with the mark (*) are the standard reference tapes.

Carefully connect the plugs of the connection wires to the left and right channel jacks. Push the plugs in all the way. Poor seating tends to cause noise or intermittent sound.

CAUTION: While you are connecting your cassette deck to the rest of your high fidelity system, unplug the power cords, disconnecting all of the components as well as your cassette deck, from the AC outlet.

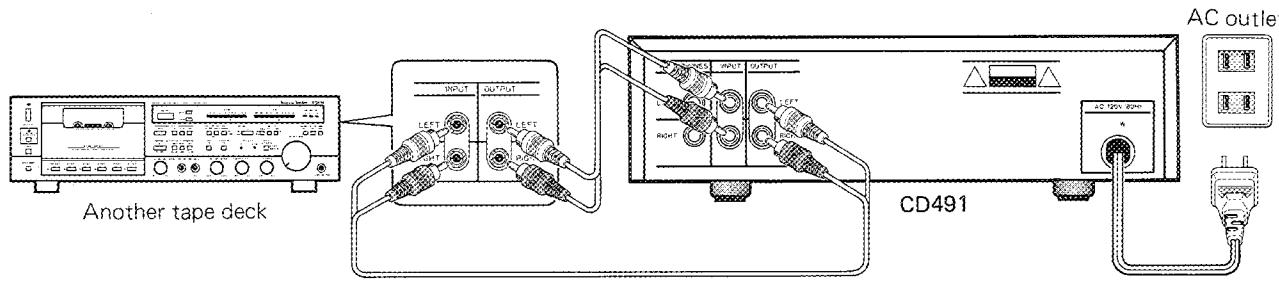
## Connection to the Receiver or Amplifier




- The input jacks of the cassette deck are marked "INPUT". However, they connect to the tape monitor output jacks on the receiver or amplifier.

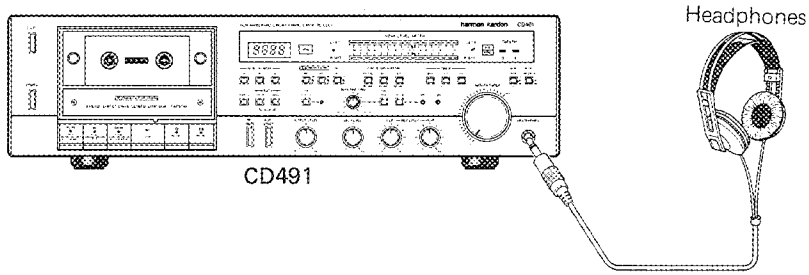
- The output jacks of the cassette deck are marked "OUTPUT". However, they connect to the tape monitor input jacks on the receiver or amplifier.

## Connection to Another Tape Deck for Dubbing



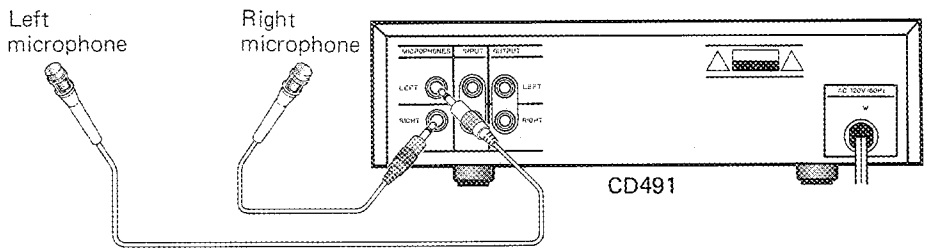

- For this application, the input of one tape deck connects to the output of the other.

## Connecting Headphones




- When headphones are connected to the HEADPHONES jack, the sound during recording or playback can be listened to without connecting this unit to a receiver.
- The volume level of the headphones can be adjusted by the OUTPUT LEVEL control. To listen to a recorded tape, press the TAPE MONITOR switch.
- Only use headphones with an impedance of more than 8Ω and a standard connecting plug.

## Connecting Microphones




- Only use low-impedance microphones (standard: 600Ω), with standard plugs.
- When recording with one microphone, connection to either the left or right channel allows a monaural recording on both channels automatically.
- For recording from microphones, see section "Recording Through Microphones" on page 9.

# DOLBY NR AND HX-PRO SYSTEMS

## Dolby B and C Noise Reduction (NR) Systems

The CD491 provides both the Dolby B and the Dolby C noise reduction systems. Dolby B has become a standard feature on many decks. Dolby C is a newer, more effective system that virtually eliminates noise from cassette recordings.

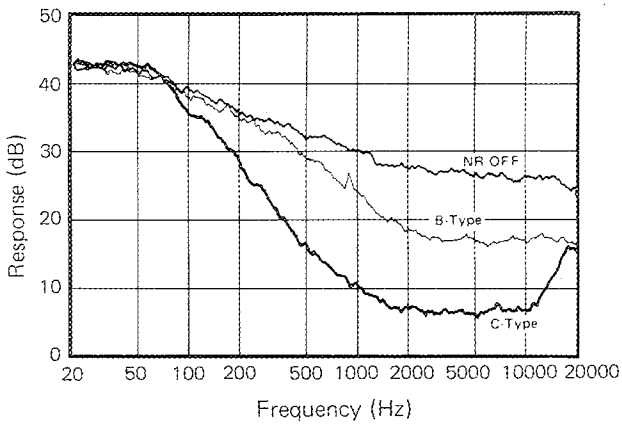
### What causes tape noise

Tape noise is inherent to some extent in all magnetic recordings. With cassette tapes, the most objectional noise is in the midrange and high frequencies and is perceived as "hiss". The amount of "hiss" is affected by many factors, such as the tape speed, the size of the magnetic particles on the tape and the level of the recorded signal. The tape speed is standardized and the CD491 is optimized for popular low noise tape formulations.

### The operating principle of Dolby noise reduction

In short, the Dolby noise reduction systems boost weak midrange and high frequency signals during the record mode, and then reduce them to their original level during playback. This enables the weak signals to be recorded at higher levels and therefore be played back at higher levels relative to the "hiss".

Dolby C has twice the noise reduction effect as Dolby B. Neither system, however, is capable of removing noise from the signal source.




Noise Spectra

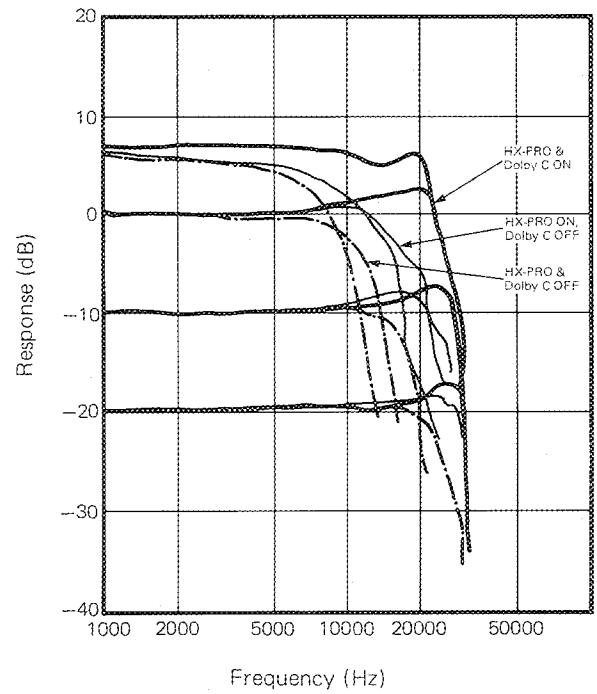
## Dolby HX-Professional Headroom Extension (HX-PRO) System

The CD491 is equipped with the Dolby HX-Professional Headroom Extension system (HX-PRO). It operates only during the record mode and does not require the user to "turn it on" or make adjustments. It is compatible with any low noise (standard), chromium dioxide ($CrO_2$), or metal audio cassette tape.

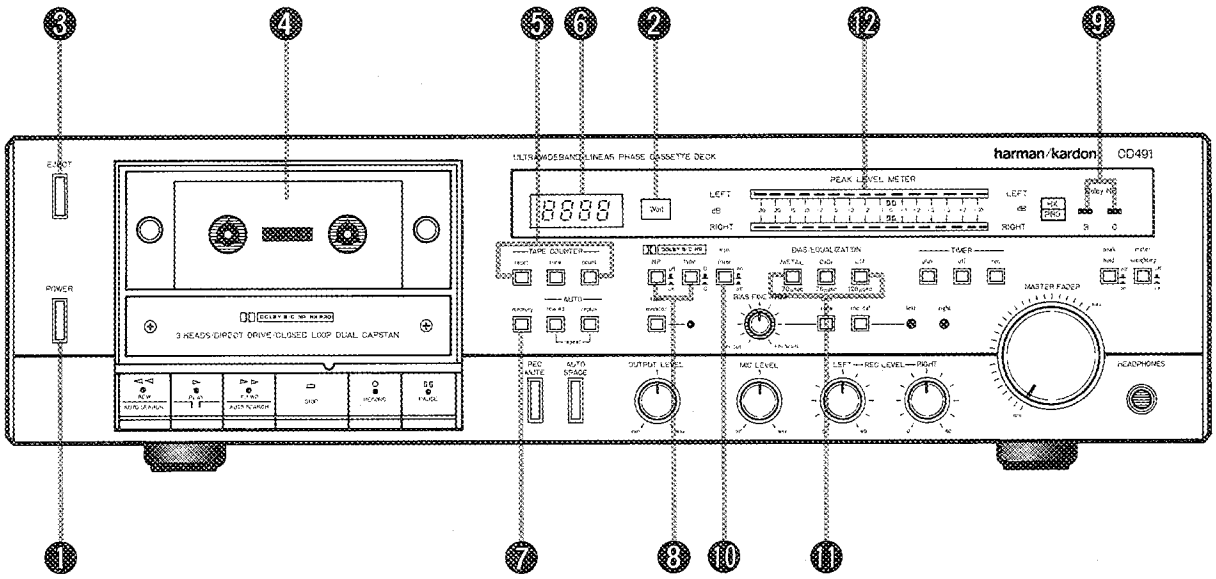
The effect of HX-PRO is that is extends the high frequency saturation (overload) level of the tape being recorded. Therefore, many of the high level, high frequency music signals that would be compressed or distorted with a conventional cassette deck will be recorded accurately by the CD491. In order to determine the optimum record level, see Recording Level Adjustment section on page 9.

The advantages of HX-PRO are:

1. The performance of low noise and chromium dioxide tapes almost equals that of the more expensive metal tapes.
2. A major improvement is made in high frequency dynamic range.
3. The higher record levels result in an increased signal-to-noise ratio.
4. No decoding is necessary. The improved recording accuracy can be appreciated with any high quality tape player, including a portable or car stereo unit.
5. It can be used with or without Dolby B and C noise reduction circuitry.




Frequency Response




**❶ POWER SWITCH (POWER)**
Pressing this switch will turn on the power and the WAIT indicator will illuminate. After about 10 seconds, the WAIT indicator will go out and the front panel will illuminate. Press the switch again to turn the power off.

**❷ WAIT INDICATOR (Wait)**
When the POWER switch is turned on, the WAIT indicator illuminates for about 10 seconds, indicating that the muting circuit is activated. When the circuit is stabilized, the WAIT indicator goes out and the front panel illuminates.

**❸ EJECT BUTTON (EJECT)**
The soft eject mechanism opens the door slowly when this button is pressed.
CAUTION: This button cannot be depressed while the tape is running. Be sure to press the STOP button before pressing the EJECT button.

**❹ CASSETTE COMPARTMENT**

**❺ TAPE COUNTER BUTTONS (TAPE COUNTER)**
**RESET BUTTON (reset)**
Press this button to reset the TAPE COUNTER when starting to record or when selecting a tape location for the memory.
**TIME BUTTON (time)**
Press this button to activate the clock. When playing or recording, the TAPE COUNTER indicates the elapsed time in minutes and seconds. This feature is not capable of determining elapsed time during fast forward or rewind. It will accurately indicate the length of a recording when it is reset to "0:00" at the beginning.
**COUNT BUTTON (count)**
When this button is pressed, the TAPE COUNTER indicates the position of the tape with an arbitrary number. It will keep track of the tape position in all modes of operation.

**❻ TAPE COUNTER**

**❼ MEMORY BUTTON (memory)**
This button allows you to easily return to a specific location on the cassette tape. Reset the TAPE COUNTER to "0" at the desired location and continue to play the tape. Then press the MEMORY button and rewind the tape. The CD491 will automatically stop when the TAPE COUNTER reaches "0".

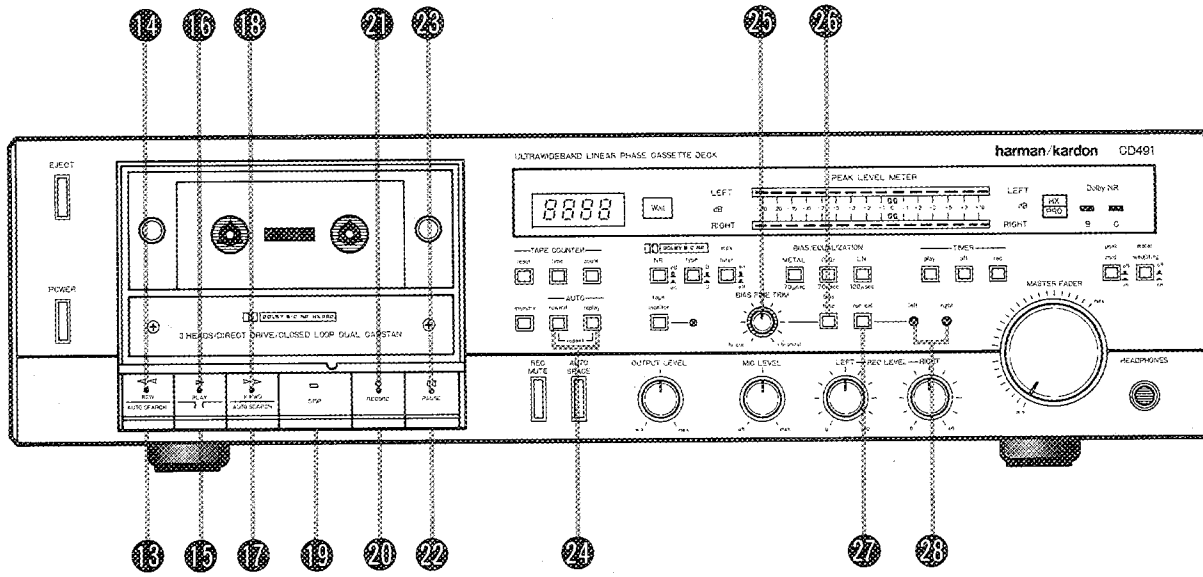
**❽ DOLBY NR SYSTEM SELECTOR (DOLBY B•C NR)**
**NR ON/OFF SELECTOR (NR)**
Depress this selector for recording or playback using the Dolby NR system. The green DOLBY NR indicator (for B-type) or the yellow one (for C-type) illuminates according to the NR TYPE selector position. Press the switch again to turn off the Dolby NR system.
**NR TYPE SELECTOR (type)**
For selection of the Dolby B- or C-type NR system. Depress this switch to select the Dolby C-type NR system. Press it again to select the Dolby B-type system.

**❾ DOLBY NR INDICATOR (Dolby NR B, C)**
For indication that Dolby B or C noise reduction circuitry is activated.

**❿ MPX FILTER SWITCH (mpx filter)**
The MPX filter is a high frequency filter that has very little effect below 16kHz, but has 30dB attenuation at 19kHz, the frequency of the FM stereo pilot signal. Depress and release this switch (to the ON position) when recording from an FM stereo tuner or receiver. However, to appreciate the ultrawideband frequency response of the CD491, depress this switch (to the OFF position) when recording all other sources, such as a turntable, tape deck, microphone, etc.

**⓫ TAPE SELECTORS (BIAS/EQUALIZATION)**
For selection of the record and playback circuitry that provides the lowest distortion and flattest frequency response for metal, $CrO_2$ or low noise tape.

**⓬ PEAK LEVEL METER (PEAK LEVEL METER)**
The level of the signal being recorded or played is displayed clearly on this meter.




⑭ REWIND/AUTO SEARCH BUTTON (REW/AUTO SEARCH)
Press this button to rewind a tape at high speed. Press this button and the PLAY button simultaneously in order to activate the reverse auto search feature.

⑬ REWIND/AUTO SEARCH INDICATOR
This indicator illuminates when the tape is rewinding, and blinks when reverse auto search is functioning.

⑮ PLAY BUTTON (PLAY)
Press this button to start playback.

⑯ PLAY INDICATOR
For indication that the tape is running.

⑰ FAST FORWARD/AUTO SEARCH BUTTON (F. FWD/AUTO SEARCH)
Press this button to quickly advance the tape in the same direction as it is played. Press this button and the PLAY button simultaneously in order to activate the forward auto search feature.

⑱ FAST FORWARD/AUTO SEARCH INDICATOR
This indicator illuminates when the tape is fast forwarding, and blinks when forward auto search is functioning.

⑲ STOP BUTTON (STOP)
Press this button to stop each operation. Pressing this button stops the playback, recording, fast forward and rewind modes. It also cancels the standby mode activated by the PAUSE button.

⑳ RECORD BUTTON (RECORD)
Press this button and the PAUSE button simultaneously to provide the record standby mode. The RECORD and PAUSE indicators will illuminate and the PLAY indicator will blink. Recording starts when the PAUSE button is pressed again, or when the PLAY button is pressed. The PLAY indicator will then stop blinking and remain illuminated.

㉑ RECORD INDICATOR
For indication that the tape is being recorded.

㉒ PAUSE BUTTON (PAUSE)
Press this button to temporarily stop playback or recording. This button also activates the record standby mode when pressed simultaneously with the RECORD button.

㉓ PAUSE INDICATOR
For indication that the pause mode has been activated.

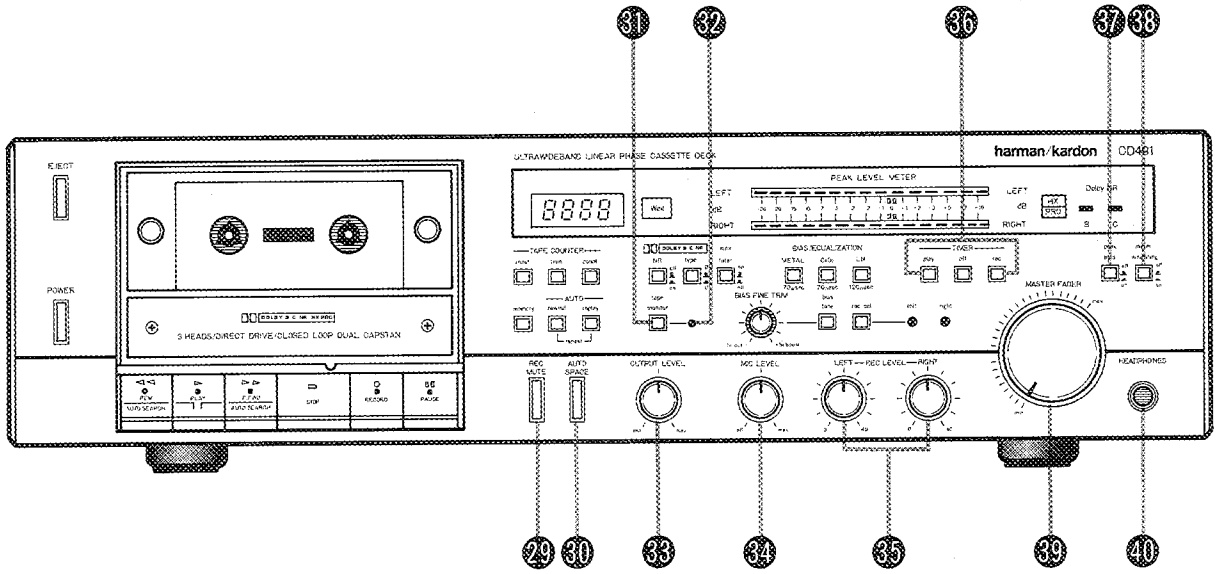
㉔ AUTOMATIC REPEAT BUTTONS (AUTO)
When these two buttons are depressed, a continuous rewind and playback cycle is created.
AUTO REWIND BUTTON (rewind)
With this button depressed, the tape will automatically be rewound when the end of the tape is reached. This feature only works in the play and record modes.
AUTO REPLAY BUTTON (replay)
With this button depressed, the play mode will activate after the auto rewind mode.
See section "Automatic Repeat Function" on page 11.

㉕ BIAS FINE TRIM KNOB (BIAS FINE TRIM)
For precise adjustment of the bias used during recording.
See section "Bias Fine Trim Feature" on page 10.

㉖ BIAS TONE BUTTON (bias tone)
When this button is held in the depressed position, high and low frequency test tones are fed to the right and left channels, respectively. The BIAS FINE TRIM knob can be precisely adjusted by observing its effect on the level of these test tones. See the "Bias Fine Trim Feature" section on page 10.

㉗ RECORD CALIBRATION BUTTON (rec cal)
When this button is held in the depressed position, a low frequency test tone is fed to each channel. This tone assists in adjustment of the RECORD CALIBRATION controls. See the "Record Calibration Feature" section on page 10.

㉘ RECORD CALIBRATION CONTROLS
These controls adjust the record/playback level. This compensates for differences in sensitivity between tapes. See the "Record Calibration Feature" section on page 10.




### ㉙ RECORD MUTE BUTTON (REC MUTE)
This button allows you to create a silent segment of tape at any time while recording. The button is a momentary contact type and will not lock in the depressed position. The record mute feature will only operate while the button is held in the depressed position.

### ㉚ AUTOMATIC SPACE BUTTON (AUTO SPACE)
Pressing this button during the record mode creates a 5 second blank segment of tape and then activates the record pause mode.

### ㉛ TAPE MONITOR SWITCH (tape monitor)
This switch determines whether the output of the cassette deck is the tape playback signal or the input (source) signal.

### ㉜ TAPE MONITOR INDICATOR
This indicates the position of the tape monitor switch.

### ㉝ OUTPUT LEVEL CONTROL (OUTPUT LEVEL)
This control adjusts the output level of the line out jacks and the headphone jack.

### ㉞ MICROPHONE LEVEL CONTROL (MIC LEVEL)
This control adjusts the input level of the microphones.

### ㉟ RECORD LEVEL CONTROLS (REC LEVEL)
These controls adjust the record level of the line input signal.

### ㊱ TIMER SWITCHES (TIMER)
These switches are used to automatically start recording or playback with an external timer.

**PLAY SWITCH (play)**
Press this switch to start automatic tape playback.

**OFF SWITCH (off)**
Press this switch when an external timer is not used.

**RECORD SWITCH (rec)**
Press this switch to start automatic recording. See the "Timer Function" section on page 12.

### ㊲ PEAK HOLD SWITCH (peak hold)
With this switch depressed, the PEAK LEVEL METER will indicate the highest level encountered during the previous 3 seconds.

### ㊳ METER WEIGHTING SWITCH (meter weighting)
Press this switch to ON position, and high frequencies are emphasized and displayed on the PEAK LEVEL METER corresponding to the saturation response of the tape. This allows you to set the optimum recording level independent of different frequencies.

### ㊴ MASTER FADER CONTROL (MASTER FADER)
This control is a convenience feature for those who wish to fade-in or fade-out while recording.

### ㊵ HEADPHONES JACK (HEADPHONES)
For connection of stereo headphones. The sound level is controlled by the OUTPUT LEVEL control.

## Tape Recording

1. Turn the volume control knob of the receiver to the minimum level and turn on the receiver. Then press the CD491 POWER switch. The WAIT indicator will illuminate, indicating that the muting circuit is activated. After about 10 seconds, the circuits will stabilize, the WAIT indicator will go out and the front panel will illuminate. This unit can now be operated as per the following procedure.
2. Press the EJECT button to open the CASSETTE COMPARTMENT door and carefully insert a cassette tape. Incorrect cassette insertion may cause a malfunction in door closing or recording.
3. Press the TAPE SELECTOR button corresponding to the type of tape being used. If no button is pressed, the unit will not record.
4. To record with the Dolby NR system, depress the NR ON/OFF selector to the ON position and select the B- or C-type with the NR TYPE selector. The B-type indicator will illuminate in green, or the C-type indicator in yellow.
5. To record from an FM stereo tuner or receiver with the Dolby NR system, set the MPX FILTER switch to the ON (out) position. This is not necessary if the tuner or receiver has 19kHz pilot cancelling.
6. Set the MICROPHONE LEVEL control to the minimum position.
7. Set the TAPE MONITOR switch to the source (out) position (the TAPE MONITOR indicator will not illuminate). The source can be heard from the headphones or speakers. Adjust the sound volume to the desired level by turning the OUTPUT LEVEL control.
8. Adjust the record level as per the instructions provided in the "Record Level Adjustment" section on this page.
9. Press the RECORD and PAUSE buttons at the same time. The RECORD and PAUSE indicators illuminate. The PLAY indicator blinks, indicating that the unit is in the "record-pause" mode. The record level is accurately displayed on the PEAK LEVEL METERS.
10. In order to create an unrecorded portion at the beginning of the tape for detection by the auto search feature, press the AUTO SPACE button immediately after pressing the PAUSE button again to start recording. The PAUSE indicator goes out and the RECORD indicator blinks for about 5 seconds while the unrecorded portion is created. After that, the unit returns to the pause mode.
11. Press the RESET button after pressing the COUNT button to reset the TAPE COUNTER indication to "0". To time the item to be recorded, press the RESET button after pressing the TIME button to reset the TAPE COUNTER indication to "0.00".
12. Press the PAUSE button again to start recording. The PAUSE indicator goes out and the RECORD indicator remains illuminated. The PLAY indicator stops blinking and also remains illuminated.
13. To monitor the recording, press the TAPE MONITOR switch. The TAPE MONITOR indicator illuminates. This allows the user to monitor the sound just recorded on the tape. Adjust the sound volume to the desired level by turning the OUTPUT LEVEL control.
14. Press the PAUSE button for temporarily stopping the tape. Press it again to restart recording.
15. Press the STOP button to stop recording.
16. Tape recording automatically stops when the end of the tape is reached and the record mode is cancelled.

NOTE: For normal operation, set the MASTER FADER control to the MAX position.

## Recording Through Microphones

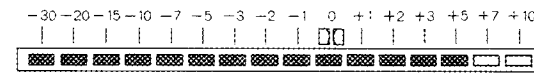
Connect the left and right microphone wires to the MICROPHONE jacks on the rear panel. When recording only through the microphones, turn the RECORD LEVEL controls for both channels to the "0" position and set the proper input level by turning the MICROPHONE LEVEL control. For mixing during recording, set the RECORD LEVEL controls and MICROPHONE LEVEL control to the desired level.

## Recording Level Adjustment

Adjust the optimum record level by turning the RECORD LEVEL controls or MICROPHONE LEVEL control while observing the PEAK LEVEL METER in order to meet the type of the tape to be recorded.

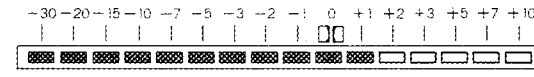
●Make adjustment as described below when the sound level is relatively high.

When using a metal tape.



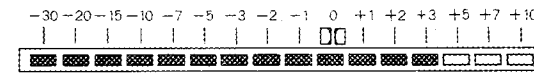

Momentary illumination up to +5dB is allowable.

When using chromium dioxide tape.




From time to time illumination up to +1dB is allowable.

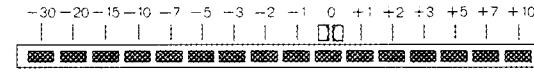
When using a low noise tape.




Momentary illumination up to +3dB is allowable.

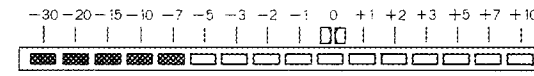
●The following adjustments will cause excessive sound distortion or tape noise.

Too high an input level setting (illumination up to +10dB).




A recording with excessive distortion will result.

Too low an input level setting (peak illumination of less than 0dB).




A recording with excessive tape noise will result.

## Bias Fine Trim Feature

The optimal amount of recording bias varies from tape to tape. The bias fine trim feature is provided to enable precise adjustment for such variations.

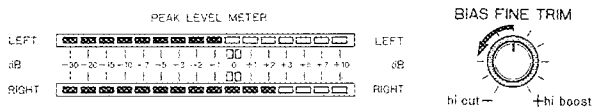
The high frequency range tends to be attenuated if the bias current is higher than the optimum value while it tends to be boosted if the bias current is less than the optimum value. Less than optimum bias also increases the amount of distortion in a recording.

This unit assists the user in determining the precise amount of bias, and therefore in obtaining the widest and flattest frequency response.

Operate as follows:

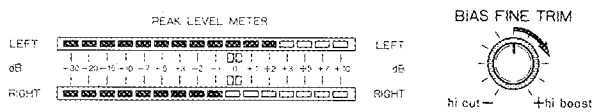
1. Insert a cassette tape in the CASSETTE COMPARTMENT and press the TAPE SELECTOR button corresponding to the type of tape being used (see table on page 2).
2. Depress the TAPE MONITOR switch and make certain that the TAPE MONITOR indicator illuminates.
3. Press the RECORD and PLAY buttons together to start recording.
4. Hold the BIAS TONE button in. A 400Hz signal and a 12.5kHz signal are recorded in the left and right channels, respectively.
5. Compare the left and right channel PEAK LEVEL METER readings. If the amount of bias is optimum, the left and right channels will have the same reading. Turn the BIAS FINE TRIM knob counterclockwise (toward the direction marked as HI CUT) if the right channel reading exceeds the left channel reading or clockwise (toward the direction marked as HI BOOST) if the left channel reading exceeds the right channel reading.

If the right channel reading exceeds the left channel reading.




Turn the knob counterclockwise.

If the left channel reading exceeds the right channel reading.




Turn the knob clockwise.

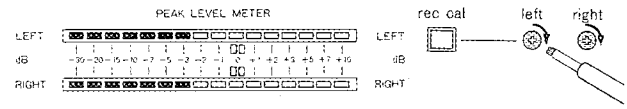
## Record Calibration Feature

Each tape has different sensitivity. As a result, a tape that is recorded at a 0dB level may have a playback level that is either higher or lower than 0dB. The record calibration feature enables the user to precisely adjust the record/playback level so that both modes correlate. This is especially important when making Dolby NR encoded recordings.

Operate as follows:

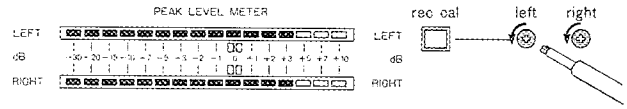
1. Insert the cassette tape to be recorded into the CASSETTE COMPARTMENT. Press the TAPE SELECTOR button according to the tape type (see table on page 2).
2. Press the TAPE MONITOR switch and make certain that the TAPE MONITOR indicator illuminates.
3. Press the RECORD and PLAY buttons together to start recording.
4. Hold in the RECORD CALIBRATION button. A 400Hz signal is recorded on each channel.
5. If the PEAK LEVEL METERS show 0dB, no adjustment is required. If the indicated level is above or below 0dB, adjust the RECORD CALIBRATION control(s) of the left and right channels using the screwdriver provided with your unit. If the indication of the PEAK LEVEL METER is below 0dB, turn the RECORD CALIBRATION control clockwise to adjust to 0dB. If the PEAK LEVEL METER reads above 0dB, turn the RECORD CALIBRATION control counterclockwise.

If the indication is below 0dB.




Turn the controls clockwise.

If the indication is above 0dB.




Turn the controls counterclockwise.

NOTE: Adjustment to 0dB may be impossible if the tape used is old or of poor quality.

## Erasing Recorded Signals

When a new recording is made on a recorded tape, the recorded sound on that part of the tape is automatically erased. To erase a recorded tape without making a new recording, operate as follows:

1. Check to be sure that erase-prevention tabs of the cassette are not broken out. Then insert a cassette tape in the CASSETTE COMPARTMENT. If broken, cover the holes with adhesive tape.
2. Turn the MASTER FADER control to the MIN position.
3. Press the TAPE SELECTOR button corresponding to the type of the tape.
4. Press the RECORD and PLAY buttons at the same time.
5. The portion of the tape that passes the tape heads will be erased.

STANDARD - MAXELL UD XL-I
CHROME - TDK SA
METAL TDK MA

# PLAYBACK OPERATIONS

## Tape Playback

1. Turn the volume control of the receiver to the minimum level and then turn it on. Select the tape monitor input to which the CD491 is connected.
2. Depress the CD491 POWER switch and the WAIT indicator will illuminate, indicating that the muting circuit is activated. The WAIT indicator will go out after about 10 seconds and the front panel will illuminate.
3. Press the EJECT button to open the CASSETTE COMPARTMENT door, and carefully insert the recorded cassette tape in the compartment. Incorrect insertion may cause failure in door closing or playback.
4. Press the TAPE SELECTOR button according to the type of tape being played.
5. Press the DOLBY NR ON/OFF selector for a tape recorded with Dolby B or Dolby C encoding. Select the B- or C-type with the NR TYPE selector.
6. Press the TAPE MONITOR switch and make certain that the TAPE MONITOR indicator illuminates.
7. Press the PLAY button. The PLAY indicator will illuminate and the tape will begin playing.
8. Gradually turn the CD491 OUTPUT LEVEL control and the volume control of your receiver until the playback level is adequate.
9. Press the PAUSE button to temporarily stop the tape. Press it again to restart tape playback.
10. Press the STOP button to stop tape playback. Press the PLAY button again to start tape playback.
11. The CD491 will automatically go into the stop mode when the end of the tape is reached.

## Automatic Repeat Function

The automatic repeat function allows you to automatically rewind the tape to a desired point or to the beginning, after recording or playback, and automatically play the tape.

Operate as follows:

1. After inserting a cassette tape in the CASSETTE COMPARTMENT, press both the AUTO REWIND and the AUTO REPLAY buttons.
2. Start tape playback, or recording.
3. To repeat tape playback from a desired point to the end of the tape: at the desired point on the tape, press the COUNT button and then the RESET button. When repeating from the beginning of the tape, set the MEMORY button to the OFF (out) position.
4. When the end of the tape is reached during playback or recording, the tape will automatically rewind. If the MEMORY button is depressed, the tape will rewind to the "0" position and then begin to play. If the MEMORY button is OFF (out), the tape will rewind to the beginning and then begin to play.
5. This rewind/replay cycle will continue until the buttons are released or the STOP button is pressed.

## Automatic Search Function

The auto search function advances the tape at high speed to the beginning of the next music segment and then plays the tape.

Operate as follows:

1. After inserting a cassette tape in the CASSETTE COMPARTMENT, press both the PLAY button and FAST FORWARD/AUTO SEARCH button or REWIND/AUTO SEARCH button. The mode is automatically switched to fast forward or rewind. When the unrecorded portion between music segments is sensed, the automatic search function is cancelled and tape playback starts from the beginning of that segment. When the REWIND/AUTO SEARCH button is pressed, the same segment is repeated. When the FAST FORWARD/AUTO SEARCH button is pressed, the next segment is played.
2. If another music segment is desired, press both the PLAY and FAST FORWARD/AUTO SEARCH or REWIND/AUTO SEARCH buttons again to return to the auto search mode.

NOTE: If the unrecorded interval between music segments is less than about 3 seconds, it may not be detected. When making a tape, the record mute or auto space features on this unit help to make adequately long and silent intervals.

# TIMER FUNCTION

By using an external timer, a source such as an FM broadcast can be automatically recorded, or a tape can be automatically played back, at any desired time.

## Automatic Recording Operation

1. Connect the power cords of the CD491 and the receiver to the timer.
2. Turn the receiver power switch ON and then select the desired source, such as an FM station.
3. Press the CD491 POWER switch and insert a cassette tape in the CASSETTE COMPARTMENT.
4. Press the TAPE SELECTOR button corresponding to the type of tape.
5. Make necessary adjustments in recording levels referring to the explanation for Recording Level Adjustment on page 9.
6. Press the TIMER RECORD switch and preset the timer to the desired time.
7. When the preset time is reached, the power to the CD491 and the receiver will be turned on. Tape recording starts after about 10 seconds. At the end of the tape, the CD491 will stop automatically.

NOTE: For late night recording, be sure to set the volume control knob of the receiver to the minimum level so that the signal being recorded will not be reproduced by the speaker systems.

## Automatic Tape Playback Operation

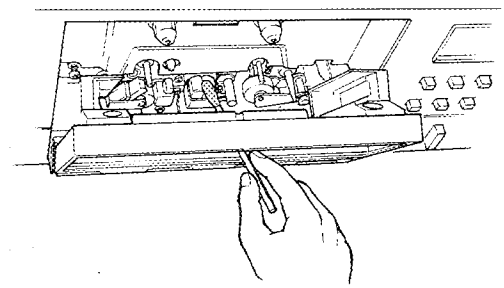
1. Connect the power cords of the CD491 and the receiver to the timer.
2. Turn the power switches of the CD491 and the receiver ON.
3. After inserting a cassette tape in the CASSETTE COMPARTMENT, press the TAPE SELECTOR button corresponding to the type of tape.
4. Adjust the CD491 OUTPUT LEVEL control and the receiver volume control to the desired level.
5. Press the TAPE MONITOR switch and confirm that the TAPE MONITOR indicator illuminates.
6. Press the TIMER PLAY switch and preset a desired time on the timer.

NOTE: To resume to normal operation, press the TIMER OFF switch.

# HEAD CLEANING

Clean the tape heads, capstans and pinch rollers from time to time to assure optimum sound reproduction. Otherwise, your CD491 may be subject to drop-outs, frequency response degradation or wow and flutter.

1. Before cleaning, open the CASSETTE COMPARTMENT door, loosen the two screws on the door cover and remove it.
2. Use a cotton swab dampened with diluted anhydrous alcohol and clean the record and playback heads, erase head, capstans and pinch rollers.
3. DO NOT START tape playback or recording until alcohol is thoroughly evaporated (about 10 minutes).



The record and playback heads, erase head and capstans will gradually become magnetized. Since the magnetism causes noise and high frequency response degradation, be sure to demagnetize these parts with a demagnetizer especially designed for this purpose.

# TROUBLESHOOTING CHECKLIST

Most of the problems are due to incorrect operation of this unit. If this unit does not operate as you intended, first check the items in the checklist. Also check other related components such as the receiver, speakers and other electrical equipment you use with this cassette deck.

| Problem | Cause | Remedy |
|---|---|---|
| The tape does not run. (Cannot record or paly-back.) | • The power cord is not plugged in.<br>• The tape is at its end.<br>• Pause mode is activated. | • Plug power cord.<br>• Rewind the tape.<br>• Cancel the pause mode by pressing the PAUSE button. |
| Unit does not play. | • The TAPE MONITOR switch is not pressed.<br>• The OUTPUT LEVEL control is set to MIN position.<br>• Sound is not recorded on the tape.<br>• Incorrect operation of the receiver.<br>• Incorrect connection to the receiver. | • Press the TAPE MONITOR switch.<br>• Turn the OUTPUT LEVEL control clockwise.<br>• Exchange with a recorded tape.<br>• Turn on the power switch and tape monitor switch of the receiver.<br>• Reconnect this unit to the receiver, referring to page 3. |
| Unit does not record. | • The erase-prevention tabs are removed from the cassette shell.<br>• Incorrect connection to the receiver.<br>• No TAPE SELECTOR button is not pressed.<br>• MASTER FADER control is set to MIN position.<br>• RECORD LEVEL controls are set to 0 position. | • Change the tape, or cover the holes with adhesive tape. (See page 2.)<br>• Reconnect this unit to the receiver. (See page 3.)<br>• Press the TAPE SELECTOR button corresponding to the type of tape.<br>• Set the MASTER FADER control to MAX position.<br>• Turn the RECORD LEVEL controls clockwise. (See page 9.) |
| Sound is distorted. | • Distorted sound is recorded on the tape.<br>• The tape is worn out.<br>• A Dolby-encoded tape is reproduced with Dolby NR ON/OFF selector OFF.<br>• Tape head is dirty of magnetized. | • Record again by setting the correct recording level. (See page 9.)<br>• Change to a new tape.<br>• Press the Dolby NR ON/OFF selector and select the type of the Dolby NR system with the NR TYPE selector.<br>• Clean the tape head with a cotton swab or demagnetize the tape head. (See page 12.) |
| High frequency sound is not reproduced clearly. | • Tape head is dirty or magnetizied.<br>• Incorrect TAPE SELECTOR button is depressed.<br>• A tape not recorded with the Dolby NR system is reproduced with the Dolby NR system ON.<br>• The bias fine trim is misadjusted. | • Clean the tape head or demagnetize it. (See page 12.)<br>• Press the correct TAPE SELECTOR button according to the type of tape. (See the table on the page 2.)<br>• Turn the Dolby NR ON/OFF selector to the OFF position.<br>• Adjust the BIAS FINE TRIM knob according to the instructions on page 10. |
| Automatic search does not function. | • The unrecorded interval between music segments is less than 3 seconds.<br>• The interval between music segments is too noisy to be detected. | • Create an unrecorded portion of more than 3 seconds.<br>• Use the record mute or auto space feature when recording. |

# SPECIFICATIONS

Frequency Response
(±3dB, Dolby out)
- LN/$CrO_2$ : 20 – 24,000Hz
- Metal : 20 – 26,000Hz

Wow and Flutter
- NAB, WRMS : 0.025%
- CCIR, WP : 0.04%

Signal-to-Noise Ratio ($CrO_2$)
- Dolby NR Off : 58dB
- Dolby B NR : 66dB
- Dolby C NR : 75dB

Input Level/Impedance
- Mic : 0.8mV/1k ohms
- Line : 40mV/22k ohms

Output Level : 420mV
(0dB, 10k ohms load)

Headphones Impedance : More than 8 ohms

Fast Forward and Rewind Time : 70 sec.
(C-60 tape)

Heads : 3 heads

Recording/Playback Head Type : Sendust/Ferrite

Dimensions (W x H x D) : 17-7/16"x4-13/16"x13-9/16"
(with legs, knobs) (443 x 123 x 345 mm)

Weight : 15lbs.14oz. (7.2kg)

Power Supply : AC 120V, 60Hz

Power Consumption : 55W